APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/724,910	11/28/2000	Hugh J. Pasika	7414.0025 / 4615	8658

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EXAMINER
WHALEY, PABLO S

ART UNIT	PAPER NUMBER
1631	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/22/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

PTOL-90A (Rev. 10/06)

	Application No.	Applicant(s)
Office Action Summary	09/724,910	PASIKA ET AL.
	Examiner	Art Unit	
	Pablo Whaley	1631	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>29 December 2006</u>.

2a)☒ This action is **FINAL.**   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>52-57</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>52-57</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .
5)☐ Notice of Informal Patent Application
6)☐ Other: _____.

DETAILED ACTION

CLAIMS UNDER EXAMINATION

Applicants' response, filed 12/29/2006, has been fully considered. Rejections and/or objections not reiterated from previous office actions are hereby withdrawn. The following rejections and/or objections are either reiterated or newly applied, as necessitated by amendment. They constitute the complete set presently being applied to the instant application. Claims herein under examination are newly added claims 52-57. Claims 1-51 have been cancelled.

CLAIM REJECTIONS - 35 USC § 112, 2nd Paragraph

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 52-57 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 52 and 55 recite the limitations "the ratio of energy in the panel with the second greatest energy." While the claims do recite "computing the energy" in each panel, there is no step directed to computing a "ratio" of anything. Therefore, there is lack of antecedent basis for this limitation. Furthermore, it is unclear whether said "first test" is a ratio test, a comparison to a threshold, or both. If applicant intends for the claimed "first test" to be a ratio test, this limitation should be clearly recited in the claim using active language. Correction is requested.

Claims 52 and 55 recite the limitations "the ratio of energy in the panel with the third greatest energy." While the claims do recite "computing the energy" in each panel, there is no step directed to computing a "ratio" of anything. Therefore, there is lack of antecedent basis for this limitation. Furthermore, it is unclear whether said "second test" is a ratio test, a comparison to a threshold, or both. If applicant intends for the claimed "second test" to be a ratio test, this limitation should be clearly recited in the claim using active language. Correction is requested.

Claims 53 and 56 recite the limitations "the maximum intensity value in the second panel." While the parent claims 52 and 55 do recite "determining the minima and maxima of the signal", these claims do not recite "intensity values." Therefore, there is lack of antecedent basis for this limitation. Correction is requested.

Claim 57 recites the limitation "the summing the square of the signal." There is lack of antecedent basis for this limitation. Correction is requested. Claim 54 is also rejected as it depends from claim 52.

This rejection is necessitated by amendment.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C.102 that form the basis

for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

> (b) the invention was patented or described in a printed publication in this or a foreign country or
> in public use or on sale in this country, more than one year prior to the date of application for
> patent in the United States.

The following prior art publications are the basis for executing this rejection:

Newly added claims 52-57 are rejected under 35 USC § 102 (b) as being anticipated by Ng

(Automating Computation Molecular Genetics, Thesis Dissertation, Carnegie Mellon University,

School of Computer Science, 1998, Abstract and p. 32, 142-148, and 279). Note: Due to the

length of Ng, it is noted that the Examiner is only supplying only the appropriate pages.

Ng teaches a novel computer-based analysis method (FAST-MAP) for fully automated

genotyping that accurately preprocesses and calls alleles from DNA fragment data [Abstract].

More specifically, Ng teaches the following aspects of the instantly claimed method: receiving

fragment analysis data representing intensity and DNA fragment length; determining peaks and

forming a signal; and reducing signal into discrete marker bands binned with integers sizes,

which is an implicit teaching for dividing the signal into "panels" based on signal maxima and

minima [p.32, Section 3.2 and Fig. 3.3], as in claims 52 and 55. Figure 3.3 [p.32] and Figure

6.12 [p.143] clearly display more than three panels, as in claims 52 and 55. Furthermore, the

instant claims do not specify any functional limitations for determining "if" at least three panels exist that would serve to distinguish the claimed method from the teachings of Ng. Ng also provides for "outputting" allele calls [p.279, ¶ 1], as in claims 52 and 55.

Ng also teaches algorithms (i.e. tests) for enumerating over candidate alleles based on ratios, and locally searching for best amplification ratios in a specified range (i.e. window) based on a "sum of squares" error calculation [p.142, Box 6.8]. More specifically, Ng teaches an ENUM algorithm that detects three candidate alleles and ranks all possible combinations (i.e. first, second, and third test) and reports the top three candidates [p.144, ¶ 2]. Therefore Ng clearly teaches the calculation of energy in each "binned" region based on a "sum of squares" technique, as in claims 52, 54, 55, and 57. Furthermore, as discrete allele data representing "binned" data are obtained from signal peaks with the maximum intensity [p.143, Fig. 6.12, Top and Middle Windows], and thus the application of the above algorithms to obtain candidate alleles [p.145, Fig. 6. 13] inherently includes "panels with the greatest energy" corresponding to "maximum intensity" values, as in claims 53 and 56.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as
set forth in section 102 of this title, if the differences between the subject matter sought to be
patented and the prior art are such that the subject matter as a whole would have been obvious
at the time the invention was made to a person having ordinary skill in the art to which said
subject matter pertains. Patentability shall not be negatived by the manner in which the invention
was made.

This application currently names joint inventors. In considering patentability of the claims under
35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was
commonly owned at the time any inventions covered therein were made absent any evidence to
the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor
and invention dates of each claim that was not commonly owned at the time a later invention was
made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35
U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 52-57 are rejected under 35 U.S.C. 103(a) as being made obvious by Perlin (US

#6,807,490; filed Feb. 15, 2000), in view of ABI PRISM Genotyper 2.5 User's Manual (PE

Biosystems, Copyright 1998, p.1-354).

Applicant's arguments, filed 12/29/2006, that Perlin (i) does not perform windowing on sample-

fragment length data, and (ii) does not teach the windowing based on the calculation of local

maxima and minima have been fully considered and are not persuasive for the following

reasons. Applicant's arguments with respect to Bahler et al. have been considered but are moot

in view of the new ground(s) of rejection.

Regarding (i): Perlin clearly teaches their invention is useful for automated fragment

analysis of DNA sample in length coordinates [Abstract]. Perlin also teach nucleic acid

windowing methods applied to reference peaks that corresponds to DNA with known lengths [Col. 17, lines 22-31]. Therefore the Examiner maintains that this is indeed a teaching for fragment length data, as required by the instant claims.

Regarding (ii): Perlin clearly teaches windowing techniques based on local minima in each window neighborhood [Col. 10, lines 7-17], peak quantitation in laddered windows [Col. 24, lines 19-30], and windows between signal maxima and minima [Fig. 6]. Therefore the Examiner maintains that this is indeed a teaching for windowing based on the calculation of local maxima and minima, as required by the instant claims. This rejection is newly applied to claims 52-57, as necessitated by amendment.

As set forth in the previous office action, Perlin teaches a method and computer device comprising software for analyzing DNA fragments from a nucleic acid sample [Col. 29, lines 60-67] and [Col. 12, lines 8-28], as in claims 52 and 55. Perlin also teaches sample DNA fragments signals representing size and intensity [Col. 29, lines 60-67 and Fig. 6], and means for calling alleles [Col. 23, lines 42-53], displaying the results, where the data has been divided into eight panels [Fig. 6], as required by claims 52 and 55.

More specifically, Perlin teaches graphical representation of signals wherein maxima and minima peaks based on intensity data and length of DNA fragment data are clearly determined [Fig. 5, 6, 7]. Perlin also teaches determining the largest peaks (i.e. either peak area or height) in allelic ladder windows (i.e. panels) [Col. 24, lines 45-55], wherein one or two peaks should contain most of the DNA signal [Fig. 8], which equates to a teaching for peak with a first and second greatest energy, as in claims 53 and 56. Perlin also clearly depicts the division of the signal into a plurality of panels based on local maxima [Fig. 7, top panel], and the division of the signal into panels at local minima and maxima [Fig. 6]. Perlin also teaches allelic windows

around a ladder peak, typically +/- 0.5bp; and sample peaks within this base pair size are designated as having lengths of the associated ladder peak [Col. 23, lines 42-50].

Perlin also teaches performing ratio calculations for peaks and comparison to a tolerance interval's greatest value [Col. 15, steps 2f, 2g, 2h] and [Fig. 11], and means for analyzing a first sample on a first size separation instrument to form a first signal, and analyzing a second sample on a second size separation instrument, and comparing the first signal with the second signal in a computing device using scoring programs [Col. 30, ¶ 3 and 4], which is a teaching for comparing multiple signals based on ratios. Perlin also teach reporting analysis and allele calling results [Figs. 6-8].

Perlin does not specifically teach computing the energy in panels based on a "sum of squares" technique, as in claims 52, 54, 55, and 57. However, Perlin does teach the calculation of "peak areas" [Col. 28, lines 40-50], which is an implicit teaching for an "integral" calculation known to equate to a "sum of squares."

ABI PRISM Genotyper 2.5 is a genotyping software system providing for manual and automated labeling and analysis of DNA fragments. ABI PRISM Genotyper 2.5 User's Manual generally teaches receiving fragment analysis data [p.71, Section 3-13]; displaying and providing user with means to label signals comprising peak and size information [p.116]; user-definable categories for defining specific peak ranges, highest peaks (i.e. maxima), minimum peaks (i.e. minima) [p.119-120], and specifically teaches data calculations methods comprising "ratios" and "sum of squares" that enable the user to compare and analyze data obtained from any selected peaks [p.210 and p.212]. ABI PRISM Genotyper 2.5 User's Manual also teaches user-definable range limits for selection of fragment signals in rectangular areas (i.e windows) [p.119, Step 2] and three such panels listed in a category list format [p.124, Step 1].

Thus it would have been obvious to someone of ordinary skill in the art at the time of the instant invention to practice the allele calling method of Perlin with the additional "sum of squares" analysis provided by ABI PRISM Genotyper 2.5, where the motivation would have use additional methods of quality scoring data before making allele calls as suggested by Perlin [Col. 24, lines 60-67] and [Col. 25, lines 10-22], resulting in the practice of the instant claimed invention. One of ordinary skill in the art would have had a reasonable expectation of successfully combining the allele calling method of Perlin with the Genotyper 2.5 software package, as the ABI PRISM Genotyper 2.5 User's Manual clearly teaches linking of Genotyper 2.5 to third-party programs or files and transferring results for further analysis of fragment peak data [p.278, Section 11-1] and [p. 292, Section 12-7]. This rejection is necessitated by amendment.

CONCLUSION

No Claims are allowed.

Applicant's amendments necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pablo Whaley whose telephone number is (571)272-4425. The examiner can normally be reached on 9:30am - 6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Irem Yucel can be reached at 571-272-0781. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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